BOTANICAL GAZETTE.

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Notes on Carex.—I.

BY L. H. BAILEY, JR.

NEW SPECIES AND VARIETIES.

CAREX HALLIANA, n. sp. Culm a foot high, smooth or nearly so, very leafy; bracts leaf-like, with thin white auricles, the lower exceeding the culm; pistillate spikes about three, an inch long, often staminate at the top, erect, approximate, shortly peduncled; perigynium ovate, tapering at both ends, prominently many-nerved, thickly covered with short, stiff hairs, gradually produced into a white, smooth, toothed beak, longer than the ovate, acute, membranaceous, often dull-margined scale; achenium large, triangular-obovoid or rarely lenticular-obovoid.—Oregon, E. Hall, 1871. Differs from *C. hirtissima*, W. Boott, its nearest ally, in its leafy culm, larger spikes, larger and strongly-nerved perigynium with a stout, white, toothless beak. It is near *C. filiformis*, L. The specimen in the Gray Herbarium is numbered 606, and, evidently by some mistake, labelled *C. amplifolia*, Boott, in Olney's handwriting.

C. RIGENS, n. sp. Stoloniferous; rough throughout; culms 6′–12′ high, stiff, mostly longer than the stiff, rough, long-pointed leaves, their bases surrounded by the fibrous remains of leaves; lower bract green, nearly as long as the culm, the upper awl-pointed, little longer or shorter than the spikes; staminate spike an inch long, shortly peduncled; pistillate spikes about three, pale, sessile, not aggregated, one-fourth inch or less long or sometimes prolonged and staminate at the top; perigynium obovoid, large, angled, many-nerved, very gradually contracted into a stout base, gradually narrowed into a short entire or slightly toothed beak, mostly shorter than the very acute thin scale; achenium obovoid. *C. varia*, Muhl., var. *Arizonica*, Bailey, Carex Cat.—Tanner's Cañon, S. Arizona (*Lemmon, 2904*), San Luis

Potosi, Mexico (*Schaffner, 547, Parry and Palmer, 917*). Described without name by W. Boott in Proc. Am. Acad. XVIII, 172. The species resembles *C. varia* in aspect, but it differs widely in its stoloniferous habit, its scabro-puberulence, its shredded lower sheaths, stiff culms, large staminate spike, and especially in the greater size, more numerous and stronger nerves, and very different shape of the perigynium.

C. MULTICAULIS, n. sp. Culms very numerous, 1–3 ft. high, stiff and wiry, terete or in weaker specimens obtusely angled, smooth (or minutely scabrous beneath the flowers), their sheaths leafless, or produced into stiff, appressed tips an inch or so long, or on the barren culms 3–6 inches long and spreading; radical leaves few or none; scales, at least the lower ones, leaf-like and prolonged into a slender tip often exceeding the culm, their bases dilated and hyaline-margined; pistillate flowers 2–6, loosely disposed at the base of an androgynous spike, the lower one often remote; perigynium very large (3–4 lines long), strongly triquetrous, the sides at maturity cross wrinkled and often concave, much contracted into a stipitate base, very finely many-nerved (rarely the nerves obsolete below), tightly enclosing the minutely punctate achenium, the very short orifice entire. *C. Geyeri*, Boott, Ill. I. 42, in part. W. Boott, Bot. Calif. II. 229, in part. —California; Yosemite Valley (544 Torrey), Ukiah (39 Bolander), Big Trees (1635 and 2306 Brewer), Plumas Co. (Mrs. Ames), Duffield's Ranch (J. M. Bigelow); Alamanden, S. W. Oregon (Thos. Howell, 1884). This species, on account of the close resemblance of its inflorescence and perigynium to *C. Geyeri*, has always been confounded with that species. *C. Geyeri* occurs in the mountains of Utah, Colorado and Montana, and W. C. Cusick finds it in Union Co., Oregon. From the above species *C. Geyeri* is at once distinguished by its much smaller size, stoloniferous habit, few and very slender, rough, angular culms, flat and rough-edged leaves which equal the culm, the absence of foliaceous bracts, its one or two pistillate flowers, and the much shorter, obtusely angled perigynium, which is only one-nerved on the center of two sides. The stiff, prolonged and numerous culms of *C. multicaulis* are wholly unlike those of *C. Geyeri*. Dr. Boott, Illust. I. 42, speaks of Geyer's specimens as having rough culms, only one or two female flowers, and the bracts not foliaceous. In the specimens of Parry and Thurber he found the culm smooth, the female flowers three or five, and the bracts foliaceous. The Table 105 represents the culms of *C. multicaulis* with the enlarged fruit of *C. Geyeri*.

CAREX APERTA, Boott, var. DIVARICATA, n. var. Differs from the typical eastern *C. aperta* in its greater size, wider leaves and looser habit, and especially in its large perigynium and very conspicuously divaricate dark scales. *C. aperta, var. B.* Boott, Illustr. IV, 132 in part.—Colorado, Oregon. Var. *minor*, Olney exsicc. is typical *C. aperta.*

CAREX CANESCENS, L , var. DUBIA, n. var. Culm stiff, 1° high, longer than the long pointed leaves; spikes 3-6, all approximate, oblong, 10-20 flowered, light tawny; perigynium gradually narrowed into a beak half or more as long as the body, minutely rough on the angles above, nerved, about the length or a little longer than the scale. *C. helvola*, Blytt? Carex Cat. Bear River Cañon, Utah (No. 1231[a] King's Survey); perhaps also the No. 1018 of Wheeler's Survey from Twin Lakes, Colorado. The variety differs from *C. canescens* in its stiffer culm, mostly shorter leaves, oblong and tawny approximate spikes, and in the characters of the perigynium. Much resembling the European *C. helvola*, itself a doubtful species, but differing in its narrower scales, and its nerved and rough-angled perigynium. In Wheeler's Report, p. 277, after No. 1018 "possibly *C. canescens*, Blytt," should read "possibly *C. helvola* Blytt."

CAREX VESICARIA AND ITS ALLIES.

The limits of this species do not become more apparent as the amount of material accumulates. The distinction between it and *C. monile*, Tuckm., is small and in some cases is well nigh impossible to make out. Forms of *C. monile* frequently occur with a narrow and gradually beaked perigynium scarcely different from the European *C. vesicaria.* The perigynium appears always to differ from that species in texture and color, characters which can not be communicated in print. The following characters are given as aids to the present determination of five of the most perplexing species of the *Vesicariæ*:

*Staminate spike one, rarely two; pistillate spikes short, erect; stigmas usually two; plants small.

C. SAXATILIS, Linn., Fl. Lapp. 259. Sp. Plant. 976 in part. Stoloniferous; culm 4′-12′ high, sharply angled, about the length of or a little longer than the narrow and sharp-pointed leaves; pistillate spikes one to three, the upper sessile or nearly so, the lower mostly more or less peduncled, all dark purple, or at maturity becoming brown; bracts narrow, long-pointed, shorter or a very

little longer than the culm; perigynium ovate-oblong or elliptic, nerveless or very inconspicuously nerved at the apex, rather abruptly contracted into a very short nearly entire beak, mostly longer than the more or less obtuse membranaceous scale. *C. pulla*, Gooden. *C. vesicaria* var. *alpigena*, Fries.—Rocky Mountains of British America to the Arctic Regions.

Var. GRAHAMI, Hook and Arn., Brit. Fl., Ed. 8, p. 510. Stouter, 12′-20′ high; perigynium lighter colored, often nearly straw-colored, prominently few-nerved, the beak longer and more conspicuously toothed. *C. Grahami*, Boott. *C. vesicaria, var. dichroa*, Anderss. *C. saxatilis*, var. *major*, Olney, King's Rep. 370.—High mountains of Colorado, Utah and northward.

Var. MILIARIS. Very slender, 6–16 inches high; leaves and bracts very narrow, almost filiform; spikes one to three, small (2–6 lines long, 2–3 lines broad), sessile or the lowest very short-stalked, brown-and-green, the upper usually ovoid or globular, sometimes very much reduced in size; perigynium ovoid, small, nerveless or nearly so, little inflated, the beak minutely toothed, about the length and broader than the acute, purple-margined scale. *C. miliaris*, Michx., Fl. Bor. Am. II. 174. *C. pulla, var. miliaris*, Carey in Gray's Man., 5th ed., 602. Moosehead Lake, Maine, and northward to Lower Canada and New Brunswick. The typical var. *miliaris* is at once distinguished from all other forms of C. *saxatilis* by its very slender habit, small, never purple spikes, and scarcely inflated perigynium. It is the least like the true representatives of the Vesicariæ. Unfortunately, most of the specimens from Maine and Canada which have been referred here are immature, but there is evidently a series of intermediate forms between this and the true *C. saxatilis*. The leaves, at least, do not appear constant. I suspect that many of the forms from that region are to be referred to *C. saxatilis*, var. *Grahami*. *C. rotundata*, Wahl., with which some of the specimens have been confounded, is more like depauperate states of *C. ampullacea*, with which Andersson unites it.—Cyp. Scand. 20.

Carex saxatilis was first described in the Flora Lapponica in 1737, before the advent of binomial nomenclature. In the Flora Suecica, 1745, the descriptive phrase from the Flora Lapponica was made a synonym of a new phrase. In the Species Plantarum, 1753, both descriptions were combined under the name *saxatilis*. The Swedish plant, with the earlier Scandinavian botanists, bore the name *saxatilis*. That plant is *C. vulgaris*, var. *alpina*, Boott (*C. rigida*, Gooden.). Dr. Boott, however, found specimens in the Linnæan Herbarium to prove that the Lapland

plant, from which Linnæus' character was first drawn, is the *C. pulla* of Goodenough, to which he restored the name *saxatilis*. Finally, however, he regarded the species as too near *C. vesicaria*.

* *Staminate spikes two or more; pistillate spikes normally long, spreading or drooping; stigmas three; plants large.

† Perigynium conspicuously turgid, ascending at maturity.

C. VESICARIA, Linn., Sp. Pl. 979. Stoloniferous; culms stout, 1°–2½° high, scabrous, shorter than the upper leaves; leaves flat, 2–3 lines broad; pistillate spikes two to four, thick (4–8 lines in diameter), the upper sessile, the lower on weak or nodding peduncles; perigynium ovate-lanceolate, one-third or less as broad as long, gradually tapering into a slender beak, 12- or more nerved, longer than the inconspicuous scale.—California and Oregon, probably in Utah. (No. 1270, King's Survey, from the Uintas, is immature, but is probably to be referred here.)

Var. MAJOR, Boott. Hook. Fl. Bor. Am. II. 221. Mostly larger; perigynium long lanceolate, greenish or rusty, many-nerved, much longer than the small scale. Var. *lanceolata*, Olney. —Tomales Bay, California, and northward to British Columbia near the coast.

Var.? OBTUSISQUAMIS, Bailey, Carex Cat. Spikes short, sessile or nearly so; perigynium broadly ovate or ovoid, mostly purplish, rather abruptly contracted into a short, nearly entire beak, longer than the broad, purple, white-margined, obtuse scale. Var. *r.* W. Boott, Bot. Calif. II. 252.—Soda Springs, Head of Tuolumne River, California. (*Brewer, 1781.*)

The typical *C. vesicaria* with light straw-colored, about 12-nerved perigynium and closely-flowered spikes, is apparently rare in this country. Var. *major* differs widely from the species in aspect, but is connected with it by intermediate forms. Var. *obtusisquamis* strongly resembles *C. monile*, to which it may belong, and in the occasional occurrence of two stigmas, and the short, sessile, often colored spikes, it approaches *C. saxatilis*.

C. MONILE, Tuckm., Enum. Method. 20. Culms usually more slender, leaves a little narrower; spikes more slender; perigynium subglobose, much inflated towards the base, one-half or more as broad as long, abruptly short-beaked, 10- or less nerved. *C. Vaseyi*, Dewey, Sill. Journ., Sec. Ser. 29, 347.—Ostrander's Meadow, California (*Bolander, 6211*), Colorado (*Vasey, 584*), and throughout the Northern United States east of the Mississippi to Subarctic British America. Dr. Boott, in his Illustr. I. 28, speaks of a form of *C. monile* with a rough beak. Upon this

form Dr. Dewey founded his *C. Vaseyi*. It is not a hybrid. *C. monile* is referred to *C. vesicaria* by Otto von Bœckeler in Linnæa, 41, p. 320.

††Perigynium not conspicuously turgid, squarrose at maturity and the spikes comose in appearance.

C. UTRICULATA, Boott, Hook. Fl. Bor. Am. II, 221. Somewhat stoloniferous; culm stout, acutely angled above, very thick and spongy at the base; leaves broad (2-6 lines), carinate at the base, much exceeding the culm, conspicuously nodulose-reticulated; pistillate spikes two to six, more or less remote, the upper sessile, the lower often on weak peduncles an inch or two long, long-cylindrical or terete (1-7 in. long), thick and compactly flowered (sometimes loosely flowered at the base), often male at the top; perigynium ellipsoid or globose-ovoid, usually gradually tapering into a short beak, broader and commonly longer than the very acute or rough-awned scale. Var. MINOR, Sartwell, is smaller in all its parts, with spikes an inch or so long.—Generally distributed in swampy places throughout the Northern United States, entirely across the continent, and in British America.

C. AMPULLACEA, Gooden., Obs. 207. Strongly stoloniferous?; culm rather slender, obtusely angled, not conspicuously thickened at the base; leaves narrow ($\frac{3}{4}$–2 lines broad), canaliculate, finely and inconspicuously nodulose below; spikes fewer, narrower and shorter, more approximate, the lower seldom conspicuously exserted; perigynium subglobose or globose-elliptic, in typical forms more shortly and abruptly beaked, longer than the normally muticous scale.—Colorado and northward, evidently throughout Western British America. The typical form is not common, and perhaps it does not occur within the limits of the United States. Specimens from our Rocky Mountain region appear to have nearly flat leaves. Von Bœckeler uses *C. rostrata*, Withering, for this species and proposes *C. Michauxiana* for the *C. rostrata* of Michaux.

John Williamson.—Obituary.

BY GEO. E. DAVENPORT.

In the BOTANICAL GAZETTE for June, 1878, the writer called attention to a hand-book on the "Ferns of Kentucky," then in the course of preparation, and asked for it a favorable reception.

Now it has become his painful duty to tell the readers of the GAZETTE that the author of that book is dead. John Williamson is dead!

Only a few years ago his name was unknown beyond the circle of a few friends and business associates; to-day it has a world-wide reputation, and is honored by the city of his adoption as among the proudest in its history.

What John Williamson, the artist-botanist, has done for art in Louisville can never be forgotten. His name will ever stand as a monumental example of what an earnest, sincere soul, animated by high aims and purposes, can accomplish under the most trying adverse surroundings, and encourage others who may be groping upward toward the light, and struggling as he struggled and groped for years, until the dawn of a triumphant career flooded all his future with promises of rich reward. How inexpressibly sad to think that just as that success for which he had worked and waited so patiently seemed within his grasp, he should have been cut off before reaping the harvest for which he had sown so well. But though denied this, and his personal presence is no longer among men, his influence will live and the impetus given to art in his adopted city by his example will go on, reaching out into broadening circles from year to year.

Williamson was a native of Scotland, and came to this country about 1866, settling soon after in Louisville, where he established himself in the business of wood-carving. Later on he became interested in a brass foundry, in the carrying on of which he acquired that knowledge of working metals which enabled him to combine so successfully, and with such exquisite results, his love for the beautiful in nature with the practical in art.

In his mind there existed to an unusual degree the happiest blending of the ideal with the real, and the vast store-house of nature which he had explored so thoroughly was made to contribute as never before to the service of decorative art.

Ferns and wild flowers, wild flowers and ferns, grace and beauty, beauty and grace, without end, worked over and over without repetition into charming variations on metal and bronze and paper, until his artistic tastes culminated in the establishment of the Williamson Art Metal Works for the purpose of carrying into practical operation his rare designs for household art decoration.

To this business he was devoting himself with wonderful energy when cut off in the very prime and strength of his man-

hood, and while on the threshold of prosperity, with the future big with splendid possibilities.

Full of indomitable energy, and possessed with the sterling Scotch integrity of character, Mr. Williamson enjoyed the fullest confidence and respect of his business associates, by whom he will be greatly missed; but it is to his many warm personal, social friends that his death and loss come home with the keenest poignancy. The charming and unaffected simplicity of his manners, brusque frankness and transparent sincerity, enabled him to make and hold fast friends who loved him for the purity and nobility of his soul, even more than for his unquestionable genius.

An ardent naturalist, he had not been in Louisville long before he sought out the Natural History Society at New Albany, across the river, and soon became known as an enthusiastic botanist. All the leisure moments he could snatch from a busy life were given up to his favorite study, with what result his fern books and etchings testify.

His was another one of those instances in which one possessed with a strong love for natural pursuits finds, or makes time, even in the midst of a busy working life, without neglecting necessary duties, and under adverse circumstances, without the advantage of means, or special training, to do some good work that leaves a mark on the page of history, of which he nor posterity need ever after be ashamed.

High on the scroll, beside the revered names of Frost and Parker, the name of Williamson, the "Louisville Mechanic," claims an honored place.

The writer's correspondence with Williamson grew out of his fern book, and soon ripened into feelings of mutual friendship, and it became a pleasant duty to aid one who, worshiping at the same shrine, brought such rich gifts and tributes to the plants which the writer had chosen for his own special study.

When the Ferns of Kentucky was published, the expense of printing etchings made it necessary to transfer them to the lithographer's stone, and in the reproduction by this process the illustrations lost much of their original beauty. No one was more sensible of this than the author, and it was this that, in a measure, led to the publication of "Fern Etchings," in the second edition of which the etchings were printed by the gifted author. Some of these etchings are marvels of beauty.

The late M. P. Whipple, of Boston, an art critic of good judgment, was warm in his praises of them, and told the writer

that in all that constituted the true test of etching—fidelity to texture and life-like expression—they were the finest work of the kind he had ever seen. Hamerton complimented them highly in a personal letter to the author, and journals abroad spoke in high terms of this work of the "Louisville Mechanic," as they called him

Williamson did not study the ferns in vain. He entered into the secrets of their innermost life, and when his dextrous needle traced their outlines in lifeless metal, they sprang into existence as vividly and life-like as when growing in their native haunts.

He was at the writer's home in June, 1881, and the magnetism of his presence drew toward him all our household, of which he quickly became a part. We walked with him over and through the adjacent portion of the "Middlesex Fells," he chatting with the children, with whom he became a great favorite, like one of themselves, yet all the while his keen glance searching for, to him, new plants and flowers. And so we led him on to where the fringed polygala still lingered in bloom, without mentioning it, that he might have the pleasure of finding it himself, when a cheery "Hallo! here is something new; what is this?" made us turn to see him bending in admiration over this charming little plant.

He was at the writer's home again during the winter of the present year, and although he appeared outwardly to be in his usual ruddy health, a tired expression in his eyes gave cause for anxiety and led us to caution him against too much overwork.

Soon after his return home he wrote that he had been confined to his room for a week by what his physician called a severe attack of neuralgia in his side, but, he added, "I think it was more serious."

On the 10th of June he wrote, "Since my last severe sickness I have never felt real well. I have a great deal of hard work to do, and now I find myself unable to do anything. I am just completely broken down, and to morrow I go to the country and take a rest."

And so he went to the mountains of West Virginia with the hope that the mountain air and a brief rest would bring him about again all right. But the season there, as elsewhere, was cold and damp, and while on the river toward evening he was taken with a congestive chill, which resulted in his death. Dr. Barksdale wrote that when he was called to attend him he found him lying on a pallet by the bank of the river, and that he only lived a half-hour after being removed to his hotel.

And so died John Williamson, on the 17th of June, 1884, and in the 46th year of his age, "his last conscious hours passed in the woods he had loved so well," writes a near and dear friend, adding that the banks of the stream and hillsides were covered with ferns, and that "I know that if he could have had his choice he would have preferred to die so, if only his dear old mother could have been by his side."

Williamson's devotion to his mother was chivalrous. He always spoke of her in terms of the deepest reverence and endearment, and if his last conscious thought could have been interpreted, it must have been for her who by his death would be left alone in her old age without a single relative in this country, though he would have known, too, that loving friends would care for and protect her.

His remains were taken to Louisville, and amid graceful tributes of flowers and ferns the artist-botanist, surrounded by sorrowing friends, was borne tenderly to his last earthly resting-place in Cave Hill Cemetery.

> Farewell, dear friend! yet not to thee farewell.
> I know that thou art living, breathing still
> In every flower and fern by rock or rill;
> And thy freed spirit evermore will haunt
> The woods and streams where all thy loved ferns dwell.
> I loved thee for thy virtues and thine art,
> And here in reverence pay this tribute of my heart.

MEDFORD, MASS., July, 1884.

Notes on the Flora of W. Dakota and E. Montana, Adjacent to the Northern Pacific Railroad*—II.

BY JOHN B. LEIBERG.

The *Compositæ*, as might be expected, were numerously represented. Species of *Liatris*, *Solidago* and *Bigelovia* were abundant. Asters were rather rare. *Helianthus lenticularis*, Dougl., (more correctly known as *H. annuus*, L., since it has been shown to be the original of the common cultivated sunflower), was the only species of this extensive genus occuring at all plentifully west of the Missouri. *Lepachys pinnata*, Torr. & Gr., was wholly replaced by *L. columnaris*, Torr. & Gr., and its variety *Tagetes*, Gray. It is curious to notice the

*Read before the Minnesota Academy of Natural Sciences, March 4, 1884.

gradual transition to *L. pinnata*, as the Red river valley is approached. A number of species of *Artemisia* were noticed; among others *A. tridentata*, Nutt. (sage-brush), but not extending eastward much beyond Pyramid Park. *Senecio lugens*, Rich., var. *Hookeri*, Eaton, was common everywhere. Species of *Hieracium* peculiar to the far west were found; also *Grindelia squarrosa*, Dunal., which extends east into the edge of Minnesota. *Troximon cuspidatum*, Pursh, common in Minnesota, was replaced by *T. glaucum*, Nutt.; and *Iva xanthiifolia*, Nutt., by *I. axillaris*, Pursh. Two species of *Gaillardia*, *G. aristata*, Pursh, and an undetermined one, were collected. *Antennaria* was represented by *A. dioica*, Gærtn., a rather pretty little plant.

Aphyllon fasciculatum, Gray, of the order *Orobanchaceæ*, was very common on the dry hill-sides, parasitic on the roots of various species of *Artemisia*.

Numerous species of *Pentstemon* and *Castilleia* made up the bulk of the *Scrophulariaceæ*.

Only one of the order *Labiatæ* was collected west of the Missouri; this was a species of *Hedeoma*.

Three species of *Echinospermum*, one *Mertensia*, and three species of *Eritrichium*, were noted as representing the *Borraginaceæ*.

Phlox cæspitosa, Nutt., is first found in going westward near the Missouri river, but only on the summit of the highest and stoniest hills; farther west it covers the ground nearly everywhere.

Asclepias Cornuti, Decaisne, was supplanted by *A. speciosa*, Torr., a closely allied species, rather more handsome though not so tall and robust.

Among the rarer *Chenopodiaceæ*, I collected *Monolepis chenopodioides*, Moq., *Eurotia lanata*, Moq., *Sarcobatus vermiculatus*, Torr. (this only in Pyramid Park), *Salicornia herbacea*, L., and three or four species of *Obione*.

Among the *Polygonaceæ*, *Rumex venosus*, Pursh, and several species of *Eriogonum* were of frequent occurence.

Shepherdia argentea, Nutt., and *S. Canadensis*, Nutt., commonly called "buffalo berries," and *Elæagnus argentea*, Pursh, the silver-berry, abounded along the streams.

A low trailing *Juniperus* was exceedingly common west of the Missouri, growing everywhere upon the sides of the dry rocky buttes.

Allium reticulatum, Fraser, two species of *Zygadenus*, *Smilacina stellata*, Desf., and *Calochortus Gunnisoni*, Watson, this last not extending east of Pyramid Park, and *Yucca angustifolia*, Pursh, make up the list of *Liliaceæ* noted in western Dakota.

Scirpus maritimus, L., was common around alkaline ponds, together with several undetermined species of *Eleocharis*. Numerous *Carices* were observed, mostly differing from Minnesota species.

The *Gramineæ* were much more sparingly represented than one would suppose to be the case. West of the Missouri fully half of the grass consisted of a single species, *Koeleria cristata*, Pers. The remaining half was divided between a dozen other species, such as *Aristida purpurea*, Nutt., an undetermined *Calamagrostis* near *C. stricta*, Trin., *Stipa Mongolica*, Turcz., and *S. viridula*, Trin., *Spartina gracilis*, Trin., *Brizopyrum spicatum*, Hook., *Bouteloua hirsuta*, Lagasca, and *B. oligostachya*, Torr., which two last commonly pass by the name of "buffalo grass," *Munroa squarrosa*, Torr., and *Buchloe dactyloides*, Engelm., the true buffalo grass, the last only occurring in scattered patches here and there. Several species of *Poa*, *Beckmannia erucæformis*, Host., *Schedonnardus Texanus*, Steud., *Eriocoma cuspidata*, Nutt., and several species of *Triticum*, complete the list of grasses collected.

Only two species of ferns were observed, a *Woodsia* and *Pellæa atropurpurea*, Link., the latter growing in the crevices of the rocky ledges on the summit of the buttes. A few mosses were seen, and two species of lichens.

The arboreal vegetation was, as might be supposed, very scanty. Aside from the timber on the Missouri river bottoms, only a few stunted willows, cottonwood, box-elder and June berry were found scattered at intervals along the streams.

A curious feature of the country west of the Missouri, beyond the limit of the drift, was the great number of fossil tree stumps protruding through the sod. Hundreds could be counted in many places, and in some localities, especially in Pyramid Park, the fossil trunks were found where they had fallen, almost whole and but little the worse for the ravages of time. There is no doubt that during the Cretaceous and Tertiary periods extensive forests flourished in this region; and to judge from the size of the stumps remaining, some of the trees must have been of immense size. Many stumps were seen ten feet or more in diameter, and I heard of others still larger.

This region will yet prove a mine of wealth to the botanist studying our fossil flora. Fossil leaves in great abundance occur everywhere in the Tertiary sandstones and soft Cretaceous clays. In some places the clay beds were originally underlaid by seams of lignite, which have been burned, baking the clay above into a kind of brown, red, or yellow brick, which shows perfectly

the forms and venation of these fossil leaves. The region is well worth the time and attention of working botanists, both in recent and fossil botany; and will doubtless ere long receive its due share of exploration and study, since it has become so easy of access.

GENERAL NOTES.

Botany and the American Association.—The Minneapolis meeting of the American Association for the Advancement of Science last year gave an impetus to the botanical interests in the Association, which promises to yield good results in bringing botanists more into each other's society. A Botanical Club was formed, and a committee appointed to arrange for the meeting in Philadelphia. This committee began its labors in April, and has since steadily endeavored to do what it could for the interests of the botanical members.

The following announcements can now be made for the Philadelphia meeting: The Association opens on Thursday morning, September 4th. During Thursday and Friday the botanical headquarters will be at the Academy of Natural Sciences, corner of 19th and Race Streets, where a committee will be in attendance to receive and introduce all members as they report themselves, to welcome them to the privileges of the Library and Herbarium of the Academy, and as far as possible to promote acquaintance and good fellowship. This committee will also be in charge of the registry book of the Club, in which it is hoped every member of the Association interested in botany will register as soon as possible after arrival. This is the only requisite to becoming a member of the Club, entitled to all the privileges of the same.

The Association will devote Saturday, September 6th, to excursions. The special botanical excursion for this day will be to the pine barrens of New Jersey, the richness of whose flora has become quite proverbial. Those interested in cryptogamic plants will doubtless have the pleasure of Mr. J. B. Ellis' leadership, whose extensive knowledge of fungi in particular, and thorough acquaintance with the region, will be of great service. Those more inclined to phanerogamic botany will find no lack of leaders. After devoting sufficient time to botanizing the general excursion of the Association to the seaside will be overtaken, and the remainder of the day passed in connection with it. There will also be excursions by the Association at the same time to the Delaware Water Gap, and to the anthracite regions, which those preferring can accompany.

Monday evening, September 8th, is the regular monthly meeting of the Botanical Section of the Philadelphia Academy of Sciences. The Section extends an invitation to the Botanical Club of the Association, the Torrey Botanical Club, of New York City, and to other visiting botanists to be present. The usual exercises will be abbreviated and supplemented by short addresses from eminent botanists. It is anticipated that Mr. John Ball, of England, who is now traveling in the western part of the United States, will be willing to give

some of his impressions of our country as compared with Europe. Dr. Asa Gray, whom we all revere as the Nestor of American botanical science, will also be present. Altogether the occasion will be one of unusual interest. The exercises will be concluded by a reception, giving an excellent opportunity for social enjoyment and the acquisition of stray bits of information.

At some time during the week there will be an excursion of botanists to the Bartram house and garden at Kingsessing, a place of much historic interest from its associations with the early botanist, whom Linnæus called "the greatest natural botanist in the world." He died in 1777. The place is yet much as he left it. The house he built with his own hands, and many of the trees he planted are still there. The old cypress tree, some thirty feet round, will show that it does not take numerous centuries to make a large tree. Some fine specimens of *Rhododendron punctatum* were there recently, and may be still a shrub we do not find often, even in its native North Carolina. A very good specimen of the rare *Quercus lyrata* is standing, together with a number of rare southern trees not often seen elsewhere.

Other excursions will be announced during the week. The meetings of the Club will be held at such times as are found most convenient, at which the reading of papers, discussions, and reports of committees will be in order.

All announcements of time and place of meeting, excursions, or other matters pertaining to the Club will be given on the daily programme of the Association.

Probably the point of most interest to botanists will be the botanical treasures of the Academy of Sciences. Here is to be found Barton's herbarium, a professor in the University of Pennsylvania and author of a work on botany, who died in 1815. The great herbarium of Schweinitz, one of the most widely known of early American general botanists, was supposed to contain 20,000 species when deposited in the Academy, but would not number so many now, owing to the degradation of many forms to mere synonyms. He was one of the earliest students of our fungi and fresh-water algæ, and his herbarium contains a large number of type specimens. Here is also the fine herbarium of Dr. Short, which is kept separate from the general collection of the Academy in accordance with an agreement with the heirs. There are also numbers of specimens of Pursh, Rafinesque, Baldwin, Darlington, Le Conte, and other famous botanists of the past, as well as of most of those who give honor to the science to-day. All these collections are arranged in a single universal series, with the exception of Dr. Short's, as before noted. As fast as accessions are received, they are poisoned and labeled, and at once put in place. Afterwards they are permanently mounted, as time for the work can be secured. By means of a reference index a stranger is able to find what is wanted in a few moments. The Academy also possesses a duplicate North American herbarium for convenience of ready reference. The total herbarium probably reaches nearly 50,000 species; but this is only a guess, for no count has been made. Mr. John H. Redfield is the conservator of the collection, and by his special study of ferns has added much to its completeness in this particular.

The director of the Botanical Section of the Academy is Dr. Ruschenberger, who has done excellent service to science; the vice-director is the widely-known botanist Thomas Meehan, who is also one of the two vice-presidents of the Academy. F. Lamson Scribner, now becoming well known as an able agrostologist, is the secretary, and the corresponding secretary is Isaac C. Martindale, whose private herbarium and botanical library many of us would envy. All these are business men without any professional vacation, and they have a

right to feel proud of their voluntary tasks on this good work. Mr. Isaac Burk should also be mentioned for the large amount of labor he has bestowed on the collection; and the whole Section, indeed, of which there are some twenty members, do all they can. It will be one of the profitable experiences of a visit to Philadelphia to note what earnest volunteers can do for the science when persistent, and determined to do good work.

The herbarium of Muhlenberg, an early botanist of much fame, is deposited with the Philosophical Society.

The very rich flora of Philadelphia and vicinity will attract collectors, and many rare plants are also to be found here. The great Fairmount Park, especially the valley of the Wissahickon and the horticultural conservatory are deserving of the attention of botanists.

The features of the meeting so far mentioned are entirely in addition to those provided by the general Association, for it is intended that the botanical meetings and excursions shall in no wise conflict with those of the Association. That this object, and the best welfare of the botanists may be secured, the Botanical Section of the Academy has appointed a committee of five to co-operate during the meeting with the committee of the Club; this committee consists of Isaac C. Martindale, Prof. J. T. Rothrock, Dr. J. Bernard Brinton, Wm. C. Stevenson, Jr., and Jos. O. Schimmel.

The announcements for the general Association are too long to be given here, and all who are not yet members should write the local secretary, Prof. H. Carvill Lewis, Academy of Sciences, Philadelphia, for the Local Committee's circular. We may, however, mention the lectures on Thursday, Friday and Tuesday evenings, September 4, 5 and 9, the reception at the Academy of Fine Arts, and the lawn party at Haverford College. The International Electrical Exhibition will be open at this time, and must prove very attractive. After the final adjournment, some long excursions of special interest will be given.

The British botanists who have already notified the Local Committee of their intention of attending the meeting are John Ball, F. R. S., F. L. S., M. R. I. A.; A. W. Bennett, F. L. S., representing the Royal Microscopical Society; Wm. Carruthers, F. R. S., F. L. S., F. G. S., from the British Museum; and Wm. Caldwell Crawford, delegate of the Royal Botanical Society of Edinburg. Sir Joseph Hooker, Prof. W. R. McNab, and Sir John Lubbock are expected at the British Association in Montreal, and may attend at Philadelphia, but of this no definite information has been received.

It still remains to say a word in reference to the Botanical Club itself, in order that no misapprehension may arise in regard to its scope and aim, and relation to the general Association. An Entomological Club has existed in connection with the Association for a number of years, and it was in emulation of the advantages secured to its members that the botanists in attendance last year at Minneapolis proposed the Botanical Club. It was organized with the slightest formality possible, and set before itself the task of promoting acquaintance and fraternal interest among the botanical members of the Association. It is not a part of the general Association, but receives its hearty sanction and encouragement; only those who are already members of the Association are eligible to membership in the Club; instead of diverting interest from the biological section of the Association, it hopes to indirectly aid in building up a larger interest in it, so far as botany is concerned. The Club will listen to short papers, and minor notes and observations, while the weightier articles will undoubtedly be presented before the section of biology.

J. C. Arthur,
J. H. Redfield,
Thomas Meehan,
Committee.

Æcidium Ranunculacearum DC.—Under this name several fungi having distinct life histories have been confounded. Schröter first pointed out that the æcidium on *Ranunculus ficaria* was a heteræcismal species connected with *Uromyces Poæ*, and distinct from the *Uromyces ficariæ* with which Fuckel, Cooke and other writers had associated it. At the present time the generally accepted view of the relationship of the Ranunculi æcidia is as follows: the æcidium on

Ranunculus ficaria belongs to Uromyces Poæ;
" repens belongs to " dactylidis;
" acris belongs to " dactylidis;
" bulbosus belongs to " dactylidis.

Cornu has recently shown, however, that *Puccinia arundinacea* has its æcidium upon *R. repens*, while Rostrup and myself hold the view that this æcidium is connected with *U. Poæ*, as the æcidium on *R. ficaria* is. Such being the state of the case, I have during the past two years conducted a series of experimental cultures with the Ranunculi æcidia. These experiments are not yet complete, but I have evidence that there are two æcidia upon *R. repens*, (1) that of *Uromyces Poæ*, and (2) that of *Puccinia Magnusiana*. Both these æcidia resemble each other closely, the one connected with *P. Magnusiana* being, however, rather later in the time of its appearance than that of *U. Poæ*. The æcidia of *U. dactylidis*, I have reason to believe, does not occur on *R. repens*, but is confined to *R. bulbosus*. The æcidium on *R. acris* has a distinct life history, which I am at present endeavoring to work out.—CHARLES B. PLOWRIGHT, *King's Lynn, England*.

Variation and Human Interference.—MR. EDITOR—In reply to the communication on p. 98, signed A. G., I will remark that I do not consider the double flowers or Thalictrum anemonides, etc., as *particularly* favorable to man's wishes, but as an instance of teratological variation. Quoting from my previous communications, on p. 79, BOT. GAZETTE, "It seems to me that where variation *of a nature favorable to man's wishes* is found in plants, and not especially beneficial to the plant, that such variation *suggests human interference* and points towards *a prehistoric cultivation*." In the January number, p. 8, I say, "We can even go further and say that if the agency of man induces numerous variations favorable to man's wants in a species, then that this presence of numerous variations in a species, of a kind favorable to man, indicates a previous agency of man."

I might perhaps have ended my communications somewhat more plainly; yet I much believe that I have given prominence to an idea which may, perhaps, upon investigation, prove useful. It will be admitted that we have feral plants or escapes, and wild plants or indigenes. Some years since M. Villemain attempted the ennobling of the wild carrot and parsnip; it is said he succeeded with the carrot. Professor Buckman, in trying like experiments, succeeded with the parsnip, but could make no impression upon the carrot. (Gard. Chron., 1862, p. 721.) It seems a plausible explanation of the difference that the one commenced with a feral, the other with a wild plant, and hence the divergence in the results. Should extended trials prove the correctness of such

an explanation, it certainly will answer to reason from the opposite direction, viz: that a quick response of a wild plant to cultivation, in changes that are *favorable to man's desires*, but not *especially beneficial to the plant*, is indicative that the supposed wild plant is really feral—especially if such changes are of a nature beneficial to man, yet unfavorable to the plant. Illustrations of this latter proposition seem quite numerous, as, for a general rule in vegetable plants, improvement in form and quality is usually coincident with a lessened ability of the plant to take care of itself, and the highly improved forms seem incapable of becoming feral.

I will say no more, however, as these and allied matters are yet under investigation, but there is indeed a need of an agricultural botany, to be studied under the domination of the evolutionary idea of man as a factor in variation. —E. LEWIS STURTEVANT.

Keenness of Observation.—After studying botany for three weeks, it was three days more before a single one of the Freshman class of Michigan Agricultural College discovered that the central odd leaflet at the tip of the midrib of a leaf of the mountain ash was usually symmetrical, although they soon discovered that the side leaflets were fullest on the lower edge.

Last year, while studying leaves, it was two days before any member of the Freshman class discovered that the leaf of the common barberry had two joints in following down to the main stem.

Of the members of such a class, very few will see that the geranium has a long torus between the five pistils. Without telling, one in five young students may see that the anthers of Lupine are not all alike; one in three will discover that the anthers of the Mallow are one-celled and kidney-shaped; one in ten, that the anthers are much in advance of the styles; about one in fifteen discovered that although the leaves were opposite, a bud usually appears only in the axil of one of each pair of those of the Sweet William (*Lychnis*). Above this bud is a slight canal, somewhat like that on the cornstalk near and above an ear of corn.—W. J. BEAL, *Agricultural College, Lansing, Mich.*

EDITORIAL NOTES

A LABORATORY for researches on bacteria has been established at Munich.

J. C. GRÖNEWEGEN, of the Botanic Garden of Amsterdam, died in June at the age of 73 years.

PROF. J. H. R. GOEPPERT, the phytopaleontologist, lately died at Breslau in his eighty-fourth year.

OBERLIN COLLEGE has secured the herbarium of Dr. Beardslee, of Painesville, Ohio, containing about 3000 species.

A SECOND EDITION of Prof. W. J. Beal's lecture on the new botany has been issued by Chas. H. Marot, Philadelphia.

PROF. D. P. PENHALLOW has a long article in the *Popular Science Monthly* for July on the nature of the diseases of plants.

DIERVILLA CANADENSIS, Willd. has become wild in several parts of Germany, according to the *Botanische Monatsschrift*.

F. SOÁCHA, of Deutschbrod, Bohemia, is preparing a flora of Austro-Hungary, to contain specimens of the plants described.

GENUINE TRUFFLES have been found in California, according to Dr. H. W. Harkness. They are, however, small and of no commercial value.

THE EXPERIMENTS of Mr. George Murray, of the British Museum, show that perfectly healthy and uninjured live salmon may be attacked by fungus.

THE INTERNATIONAL HORTICULTURAL EXHIBITION at St. Petersburg has awarded a medal to Dr. Gobi, the Russian algologist, for his remarkable herbarium.

DR. S. SCHWENDENER, of Berlin, has been elected foreign associate of the Linnean Society of London, to fill the vacancy made by the death of Dr. Engelmann.

MACMILLAN & CO. have in press an illustrated work, by Worthington G. Smith, on diseases of field and garden crops. This is the first work of the kind in the English language, and one much needed.

PROF. TRELEASE figures and describes the rose rot, *Peronospora sparsa*, in the *Gardener's Monthly* for July. It has become troublesome in the greenhouses of Philadelphia, and threatens to spread and cause much loss to florists.

MR. JOHN C. BRANNER has contributed a valuable study on the "Course and Growth of the Fibro-vascular Bundles in Palms" to the Proceedings of the American Philosophical Society, which we shall take occasion to refer to again.

WE LEARN FROM the Providence papers that a Mrs. Metcalf has given to Brown University thirteen acres of valuable land in that city for the establishment of a Botanic Garden. We sincerely hope that the information is authentic.

MR. WALTER DEANE, of Cambridge, Mass., reports having found *Festuca Myurus*, L. growing very abundantly at Nantucket, Mass., a locality much farther north than that given in Gray's Manual. Specimens have been deposited in the Gray Herbarium.

THE GAZETTE has been delayed this month that we might be able to present as full an account as possible of the attractions for botanists at the coming meeting of the A. A. A. S. Let all who can possibly do so attend this meeting. None will be disappointed.

THE THIRD MEMOIRE on rhizotaxy, by M. D. Clos, is devoted to *Des Racines Caulinaires*, or the arrangement of roots arising from stems. He divides them into those (*a*) of the nodes, (*b*) of the internodes, and (*c*) of the two combined. The first division is the largest, and is divided into those (1) variously placed, (2) beneath the nodes, (3) encircling the nodes, and (4) strictly axillary. The same mode of growth generally pervades a genus or order.

WE LEARN from the *Am. Microscopical Journal* that Prof. Baird will cause the *Utricularieæ* to be thoroughly eradicated from the ponds of the U. S. Fish Commission, especially *U. vulgaris*, as it is found that the bladders of the plants entrap and kill large numbers of young fish.

PROF. DR. LEIMBACH, of Sondershausen, Germany, has as yet received no response to his offer to exchange for or purchase good herbarium specimens of American *Orchidaceæ*. Collectors will confer a favor by communicating with him, although they may have but a few kinds to offer.

THE SECOND NUMBER OF *Drugs and Medicines of N. A.* is fully equal to the first, if not even better. It is devoted to the several species of *Hepatica* and *Ranunculus*, and is profusely illustrated with original cuts and plates, and a map showing the distribution of *Anemone Hepatica* and *A. acutiloba*.

WE CLIP the following from the *Salem* (Mass.) *Gazette* of July 15th:

Within a few weeks the arrangement of the botanical collections belonging to the Peabody Academy, which has proceeded quietly for the past nine years, has been completed, and the cabinet of dried plants may now be examined by students in a pleasant room with reference books and microscopes at hand.

A REVIEW OF Lesquereux and James' Manual of the Mosses of N. A. by Eugene A. Rau will be published in the September number of the GAZETTE, in which Mr. Rau supplements the habitats of many species as given in the Manual. It will be especially valuable to those who have purchased the book.

PROF. E. RAY LANKESTER says, in the April *Quart. Jour. of Micros. Science*, that "there is no more reason for regarding the chlorophyll corpuscles of Spongilla or of Hydra as parasites, than there is for so regarding the chlorophyll corpuscles in the leaf of a buttercup"; that is, they are not imprisoned algæ, but a legitimate part of the animal.

W. G. SMITH, who professes to be among the most conservative of botanists, promulgates a theory in a late number of the *Gardener's Chronicle* which is more heterodox than the one he flings derision at. He considers that the æcidia spores of *Æcidium Convallariæ*, Schum. are fertilized by direct contact of the spermatia, and then fall to the ground for a period of rest. He believes the species autonomous.

IN A COMMUNICATION to the Linnean Society in March, and later in the *Torrey Bulletin*, Mr. Chas. B. Plowright has shown the genetic connection between æcidium on the European daisy and *Puccinia obscura*, one of the two *Pucciniæ* on *Luzula campestris*. The absence of the æcidial form in this country is the text of an interesting article by the same author in the *Torrey Bulletin* for June on the æcidia-bearing *Uredineæ* as to their deportment when the æcidum is present or absent.

MRS. A. LINCOLN PHELPS, of Baltimore, Md., died on the 14th of July in her 91st year. She will be best remembered as the author of Mrs. Lincoln's Botany, a work that was received with much favor in its day. She was the daughter of Samuel Hart, of Connecticut, was educated by her sister, Mrs. Willard, and in her youth was known as Miss Willard of Troy, N. Y. Her first

husband, Simeon Lincoln, an editor, died in 1823, and her second husband, Judge Phelps, of Vermont, in 1848. The larger part of her life has been devoted to teaching, and writing upon scientific and educational subjects. She was for some time editor of the *Patapsco Magazine*.

WE ARE PROMISED a handbook for self instruction in the practical details of microscopic botany adapted to both beginners and advanced students, by the renowned Dr. Edward Strasburger, professor of botany in the University of Bonn. It is entitled "Das Botanische Practicum," and is to deal with all sides of modern microscopical technique, even to the culture of bacteria, and at the same time to impart a general knowledge of botany. It is finely illustrated with 182 cuts, which, together with the material of the text, are almost entirely new, and specially prepared for the work. The author's knowledge in the most abstruse kinds of botanical research, such as the structure of protoplasm, etc., assures us a work of the highest value. It should be translated into English.

CURRENT LITERATURE.

Desmids of the United States and List of American Pediastrums, with Eleven Hundred Illustrations. By the Rev. Francis Wolle. Bethlehem, 1884. 8vo. 168 pp. 53 col. pl.

The author has done a lasting service to microscopic botany by the publication of this excellent work. Such manuals in all classes of the lower plants are much needed, and it is gratifying to note the growing interest in this country in the study of microscopic plants, rendering publications of this kind possible by creating a sufficient demand to pay the cost of production, which is all the authors usually ask or expect. The work before us is a large octavo, well printed, substantially bound, and with fine illustrations. The preface is devoted to a notice of the collectors and systematists who have given attention to this class of American fresh-water algæ. Then follow some remarks on algæ in general, the collection and preservation of desmids, and the structure and reproduction of the same. Most of the remainder of the work is given to the descriptions and illustrations of the nearly five hundred species of desmids and ten of pediastrums. The two largest genera are *Cosmarium* and *Staurastrum*, embracing respectively 108 and 111 species. The only fault one is inclined to find with this part is the omission of full references to the sources of original publication of the species. To be sure the author has indirectly provided for this by giving a list of works consulted, but the direct references are still needed. One half the volume is occupied by the plates. These are well executed, and the sight of them is alone enough to awaken interest in the simple yet diversified and attractive plants. The drawing and engraving are both good, and the hand coloring, by permitting fine gradations in shading and unlimited variety in tints, gives a pleasing and natural effect. A good index completes the volume.

It would not do to close this review without calling attention to the remarkably low price ($5.00) at which the work is offered. This has been made possible by the author assuming the responsibility of its sale. We hope his philanthropy may meet with fitting reward.